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TITLE: Long-Term Outcomes of Veterans Discharged with Disabilities from the U.S. Army

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Paul J. Amoroso, M.D.				
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following outcomes: type and intensity of VA services received, change in disability status, and mortality. These outcomes will be correlated with risk factors drawn from the demographic, utilization, and health habits variables found in the USARIEM database.

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Introduction

This is a unique collaboration between investigators from the US Army Research Institute of Environmental Medicine (USARIEM) and the VA Health Service Research Program/Massachusetts Veterans Epidemiological Research and Information Center (MAVERIC). Both groups of investigators have extensive experience working with their respective databases, merging large complex databases, and conducting epidemiological and health services research. This is an opportunity for the VA to understand which disabled veterans obtain care in the VA and identify predictors of the type and intensity of service utilization. The VA can use this information to improve the effectiveness and efficiency of its delivery system. It is an opportunity for the Army to recapture lost follow-up time on important disability cases. Such information is needed in order to elucidate the natural history of many injury and disease processes for which there is a general lack of information and possibly no source of comparable data in the civilian section. This information could have great utility to the military services for informing the process of recruiting and training soldiers, as well as the medical management of soldiers who suffer disabling conditions. The ability to detect death. disability, and deteriorating health status related to service (but not manifesting itself until well after discharge) will also be of significant benefit to the DoD.

Body

Task 1: USARIEM establishes study cohort using TAIHOD database. Prepares index file with subject Ids to send to VA.

USARIEM established a cohort of Army discharges using the TAIHOD database. The cohort consists of 280,444 veterans discharged from the military between 1985-1999. The cohort is composed of 3 groups of cases and a matching number of controls. 85,676 cases are disability discharges of no specific nature; 15,508 have a disability record but were not discharged due to the disability; and 39,038 had a hospitalization for a knee or back injury within 5 years of discharge, but were not discharged with a disability. The cohort consists of 140,222 controls without any disability records or hospitalizations. Page 12 of the appendix is a flow chart that outlines how the cases and controls were selected.

We will be focusing initial analyses on the subset of soldiers with either discharges due to a knee or back injury (22,200), the subset of soldiers with a knee or back disability record (1,700) but not discharged due to the disability, and the soldiers with hospitalization for a knee or back injury within 5 years of discharge but were not discharged with a disability (39,038).

Prior to the creation of this cohort, a pilot study was conducted with the purpose of determining the proportion of VA enrollees and the volume of VA utilization data expected. USARIEM selected 3000 Army personnel discharged in either 1982 or 1983. The sample of 3000 subjects consisted of 1000 disability discharges, 1000 with a history of knee or back hospitalization but not a disability discharge, and 1000 controls with no history of disability discharge or knee or back related hospitalization. This sample was passed through the inpatient and outpatient data files at the VA national computer center. Utilization data from 1980 to 2000 was collected. 28.7% of the sample had an inpatient encounter and 55.7% had an outpatient encounter at least once between 1980 and 2000. The group of veterans with a permanent disability had the greatest number of encounters (60.2% inpatient, 93.5% outpatient), followed by those with a knee or back hospitalization (23.1% inpatient, 55.9% outpatient). The control group had the fewest people receiving care from the VA healthcare system (7.9% inpatient, 24.0% outpatient). Page 13 of the appendix is a table of the findings of this pilot work.

Task 2. Merge TAIHOD index file with VA utilization data at VA national computer center. Transfer of matched inpatient and outpatient data records to Boston VA Healthcare facility.

The index file of 280,444 SSNs was released to the VA from USARIEM and matched with all utilization data at the VA national computer center for fiscal years 1985-2000. The results of the inpatient matches can be found on pages 14-15 of the appendix, and the outpatient results are outlined on page 16. The index file was also matched with data from the Compensation and Pension file

and the BIRLS mortality database. All matching records were transferred to the VA Boston Healthcare System. Page 17 of the appendix is a table of the VA utilization files used and their location in the national computer center.

Task 3. Creation of analytic data file from the TAIHOD database.

Army records for members of the cohort were assembled at USARIEM. The study cohort SSNs were matched against TAIHOD personnel files (demographics, discharge/loss), hospitalization, physical disability boards, and casualty (death) files. All records matching the cohort SSNs were kept. Page 18 of the appendix is a table of the TAIHOD files used and their contents.

Task 4. Linkage of matched VA utilization data with TAIHOD data files.

A third party, the Defense Manpower Data Center (DMDC), is now linking the data sets compiled by the VA and USARIEM. A new subject ID was created for each SSN within the VA and Army data files. All data files were sent to the DMDC where they are converting the subject ID created by the VA and USARIEM to a completely new subject ID. The final analytic data set returned to the VA and USARIEM will be stripped of all identifiers except for the ID created by DMDC. Analyses will then be conducted using these data. Linkage of the many data sets will be possible using the new ID added to each file.

Task 5. Analyses of VA research questions.

We have not completed this task of the project at this time.

Task 6. Analyses of US Army research questions.

We have not completed this task of the project at this time.

Task 7. Final analyses, prepare final report and manuscripts for publication.

We have not completed this task of the project at this time.

Key Research Accomplishments

There are no research accomplishments to report at this time.

Reportable Outcomes

Presentations:

Wright S. Using VA and U.S. Army databases for disability research. Consortium of Injury Disability Research Symposium, 3/2001.

Wright S. Administrative health data Systems in the VA. Fourteenth Conference on Military Medicine - A Challenge to Readiness: Injuries in the Military. 4/2001.

Manuscripts:

A manuscript that explores the overview and concepts of the project is currently in progress. The paper is titled "From Soldier to Veteran: Linking Data from the DoD and VA to Study the Natural History of Injury-Related Disability". Topics include the background on the need for this type of research, the goals of our project, specifics on how the study is being conducted, unique methods for protecting confidentiality (1), and the future benefits.

Conclusions

There are no conclusions to report at this time.

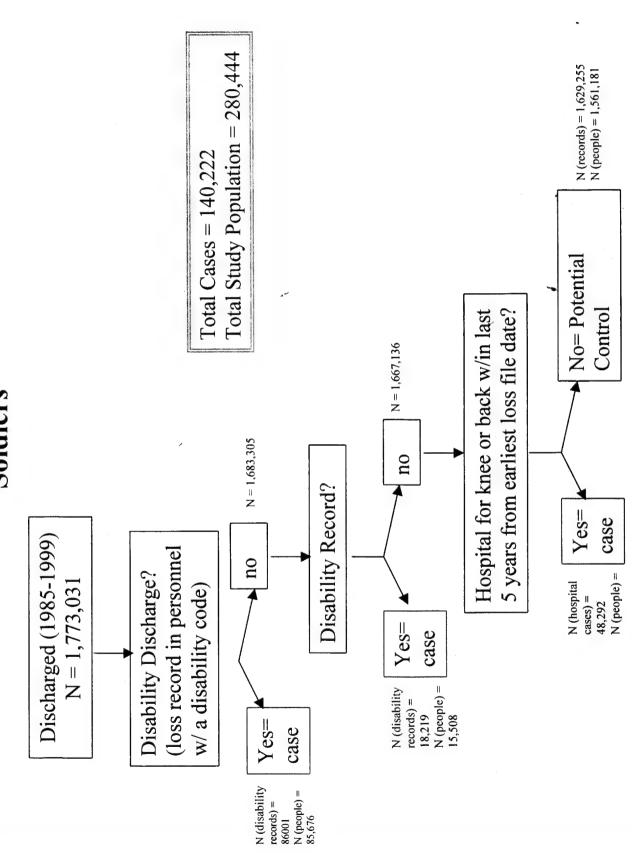
References

1. U.S. General Accounting Office, *Record Linkage and Privacy: Issues in creating new federal research and statistical information*. 2001, U.S. General Accounting Office: Washington, D.C.

Appendices

- Page 12: Flow chart that outlines how the cases and controls within the cohort were selected.
- Page 13: Results of pilot work on sample of 3000 Veterans; VA utilization matches for years 1980-2000.
- Pages 14-15: Results of matching the index file with all the VA inpatient utilization files at the VA national computer center.
- Page 16: Results of matching the index file with all the VA outpatient utilization files at the VA national computer center.
- Page 17: Table of all VA utilization files used and their locations at the VA national computer center.
- Page 18: Table of all TAIHOD data used and their sources.

Flow-Chart for Case and Control Selection: Active Duty Army Soldiers



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			<u></u>	_	7	75	198	242	190	257	488	625	611	613	598	592	611	593	613	641	648	217	699	694	704	1515
ţ			Total	%	0.2%	2.5%	6.6%	8.2%	6.5%	8.8%	16.8%	21.6%	21.2%	21.3%	20.9%	20.8%	21.5%	20.9%	21.7%	22.7%	23.1%	7.8%	24.1%	25.1%	25.7%	55.7%
bjec		ŏ		c	2	4	21	25	16	13	29	20	40	43	42	47	45	47	54	28	99	29	20	74	74	233
nS 0(Out-Patient Visits	No Dis. Or	Hosp.	%	0.2%	0.4%	2.1%	2.5%	1.6%	1.3%	2.9%	5.1%	4.1%	4.4%	4.3%	4.8%	4.6%	4.8%	2.5%	2.9%	6.7%	%6.9	7.2%	7.6%	7.6%	24.0%
f 300	-Patie			c	2	19	99	20	55	20	140	175	168	185	179	172	189	181	202	203	204	217	231	250	252	528
udy o	O	Knee or Back	Hosp	%	0.2%	1.9%	2.6%	7.1%	2.6%	7.1%	14.2%	17.8%	17.1%	18.9%	18.4%	17.7%	19.5%	18.7%	20.9%	21.0%	21.2%	22.6%	24.2%	26.2%	26.6%	25.9%
ot St		****)is	ے	က	52	121	147	119	174	319	400	403	385	377	373	377	365	357	380	378	367	368	370	378	754
1980-2000 for Pilot Study of 3000 Subjects	-		Perm. Dis	%	0.3%	5.2%	12.2%	15.4%	12.7%	18.6%	34.4%	43.4%	44.0%	42.4%	41.9%	41.7%	42.3%	41.2%	40.6%	43.6%	43.6%	43.0%	43.6%	44.3%	46.2%	93.5%
000				٦	16	83	132	160	138	136	130	150	124	118	40	131	132	108	131	146	127	105	113	94	87	780
980-2			Total	%	0.5%	2.8%	4.4%	5.4%	4.7%	4.7%	4.5%	5.2%	4.3%	4.1%	1.4%	4.6%	4.6%	3.8%	4.6%	5.2%	4.5%	3.8%	4.1%	3.4%	3.2%	28.7%
1 1		Š	Sp.	c	1	3	9	4	9	8	7	6	9	6	7	11	8	9	2	18	14	8	5	8	2	77
) yea	Visits	No Dis.	Or Hosp	%	0.1%	0.3%	0.6%	0.4%	%9.0	0.8%	0.7%	%6.0	%9.0	0.9%	0.7%	1.1%	0.8%	0.6%	0.5%	1.8%	1.4%	0.8%	0.5%	0.8%	0.2%	7.9%
uring	In-Patient Visits	Back	0	c	9	4	17	21	20	17	28	28	56	58	23	25	31	28	35	39	35	30	39	26	20	218
ization during years	In-P	Knee or Back	Hosp	%	0.6%	0.4%	1.7%	2.1%	2.0%	1.7%	2.8%	2.9%	2.7%	3.0%	2.4%	2.6%	3.2%	2.9%	3.6%	4.0%	3.6%	3.1%	4.1%	2.7%	2.1%	23.1%
			Ois	c	6	9/	109	135	112	111	92	113	92	80	90	92	93	74	91	89	78	29	69	09	65	485
ent Ut			Perm. Di	%	0.9%	7.6%	11.0%	14.1%	11.9%	11.9%	10.3%	12.3%	10.1%	8.8%	10.0%	10.6%	10.4%	8.4%	10.4%	10.2%	9.0%	7.8%	8.2%	7.2%	7.9%	60.2%
utpati			Total		0	17	38	22	11	12	6	6	10	13	9	7	6	6	6	11	17	15	12	22	20	278
and C	hs	No Dis. Or	Hosp.		0	2	2	က	2	1	2	1	0	0	0	1	2	1	2	2	1	2	0	1	3	28
VA Inpatient and Outpatient Util	Deaths	Knee or No Dis Back Or	Hosp		0	4	4	2	2	4	2	2	3	4	2	2	2	1	0	4	3	3	3	5	4	56
VA In		Perm.	Dis		0	11	32	17	7	7	5	9	7	6	4	4	5	7	7	5	13	10	6	16	13	194
			YEAR		1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Total

Results of Matching Index File with VA Inpatient Utilization Files

Main	Main File 1985-1990										
								VA Encounter	Avg # Days		
	Number	Number				Max		Before	between		
	Records in	Matching	Number	Average			First VA	DOD	Visit and	(Avg.,Min,	
FY	File	Records	People	# Visits	Visits	Visits	Encounter	Discharge	Dis.	Max)	
1985	1,031,298	692	519	1.3	1	16	519	352	859	28.3, 17, 76	
1986	1,055,251	1787	1179	1.5	1	83	1043	303	674	28.9, 18, 68	
1987	1,055,456	2653	1842	1.4	1	12	1444	294	594	28.8, 17, 82	
1988	1,071,146	3695	2478	1.5	1	20	1792	331	602	29.6, 18, 69	
1989	1,055,251	4451	2979	1.5	1	17	1952	287	458	30.2, 17, 60	
1990	981,887	4087	2693	1.5	1	85	1571	181	485	30.9, 18, 90	
1991	944,162	5829	3690	1.58	1	154	2124	226	442	31.2, 18, 66	
1992	922,514	6319	4104	1.54	1	57	2242	198	529	31.7, 18, 92	
1993	909,896	7085	4640	1.53	1	62	2437	181	454	32.3, 18, 93	
1994	901,665	8094	5229	1.55	1	94	2635	197	455	33.2, 18, 94	
1995	873,975	8308	5279	1.57	1	17	2448	159	401	33.9, 18, 76	
1996	809,717	8334	5224	1.6	1	19	2251	176	407	35.2, 18, 63	
1997	671,087	7268	4618	1.57	1	28	1822	138	333	35.7, 17, 69	
1998	604,946	6549	4202	1.56	1	17	1583	88	211	36.5, 18, 67	
1999	581,226	6593	4273	1.54	1	21	1617	53	124	37.0, 19, 70	
2000	564,013	6401	4194	1.53	1	14	1460	1	345	38.4, 20, 71	
Total	14,033,490	88145	28940	2.9	1	230	28940	3165	532	32.9, 17, 94	

Bedse	Bedsection File 1985-1990										
								VA Encounter	Avg # Days		
	Number	Number				Max		Before	between		
	Records in	Matching	Number	Average	Min#	#	First VA	DOD	Visit and		
FY	File	Records	People	# Visits	Visits	Visits	Encounter	Discharge	Dis.		
1985	1,297,706	786	519	1.5	1	16	519	352	859		
1986	1,365,202	2055	1179	1.7	1	83	1043	303	674		
1987	1,424,165	3142	1842	1.4	1	14	1444	294	594		
1988	1,432,528	4368	2478	1.4	1	20	1792	331	602		
1989	1,355,361	5211	2979	1.4	1	20	1952	287	458		
1990	1,273,331	5604	3238	2.0	1	85	1899	225	502		
1991	1,238,618	6658	3690	1.8	1	154	2031	223	434		
1992	1,231,580	7337	4104	1.79	1	57	2209	198	529		
1993	1,212,875	8148	4640	1.76	1	62	2419	181	454		
1994	1,199,831	9295	5229	1.78	1	94	2626	197	455		
1995	1,164,709	9697	5279	1.84	1	22	2440	159	401		
1996	1,091,516	9765	5224	1.87	1	27	2242	176	407		
1997	913,990	8552	4618	1.85	1	28	1819	138	333		
1998	831,480	7833	4202	1.86	1	27	1578	88	211		
1999	797,061	7883	4273	1.84	1	21	1617	53	124		
2000	762,483	7762	4194	1.85	1	16	1455	1	345		
Total	18,592,436	104096	29085	3.38	1	233	29085	3206	532		

Surge	Surgery File 1985-1990											
								VA Encounter	Avg # Days			
	Number	Number	Niconalaaa	A.,	N4: 4	Max #	First VA	Before DOD	between			
FY	Records in File	Matching Records	Number People	Average # Surg.	Min # Surg.	# Surg.	Encounter	Discharge	Visit and Dis.			
		191	143	# 3dig.	1	12	143	90	979			
1985	293,004				•							
1986	290,510	444	352	1.3	1	11	329	82	1038			
1987	279,860	716	532	1.3	1	16	485	65	671			
1988	274,331	892	718	1.2	1	10	610	75	869			
1989	263,869	1099	905	1.2	1	8	750	63	719			
1990	253,658	1201	984	1.2	1	8	768	44	630			
1991	243,740	1359	1135	1.2	1	9	861	56	505			
1992	239,313	1577	1305	1.2	1	9	1013	56	596			
1993	234,930	1722	1419	1.2	1	10	1044	41	663			
1994	228,275	1921	1600	1.2	1	8	1179	58	558			
1995	214,397	1826	1524	1.2	1	9	1062	43	572			
1996	189,572	1718	1420	1.2	1	10	975	55	512			
1997	142,185	1340	1087	1.23	1	10	720	37	386			
1998	118,585	1100	886	1.24	1	15	601	17	300			
1999	114,764	1084	890	1.22	1	10	596	5	133			
2000	109,088	1100	927	1.19	1	7	622	0	0			
Total	3,490,081	19290	11758	1.55	1	40	11758	787	698			

Proce	Procedure File 1988-1990											
FY	Number Records in File	Number Matching Records	Number People	Average # Proc.	Min # Proc.	Max # Proc.	First VA Encounter	VA Encounter Before DOD Discharge	Avg # Days between Visit and Dis.			
1988	1,054,402	3358	1347	2.5	1	36	1347	217	522			
1989	1,073,205	3806	1586	2.4	1	30	1275	178	522			
1990	1,087,035	4528	1902	2.4	1	35	1404	159	437			
1991	1,088,878	5545	2195	2.53	1	40	1440	140	411			
1992	1,090,404	5987	2422	2.47	1	55	1497	114	448			
1993	1,119,504	6774	2815	2.41	1	71	1668	104	364			
1994	1,146,390	7932	3270	2.43	1	120	1873	118	467			
1995	1,123,707	8016	3290	2.44	1	32	1744	94	389			
1996	1,049,365	8643	3371	2.56	1	54	1682	110	353			
1997	882,783	7267	2845	2.55	1	37	1304	81	338			
1998	788,027	6189	2623	2.36	1	42	1159	60	210			
1999	781,478	6488	2686	2.42	1	41	1196	32	176			
2000	773,507	6441	2550	2.53	1	37	1027	1	345			
Total	13,058,685	80974	18616	4.19	1	268	18616	1408	425			

Results of Matching Index File with VA Outpatient Utilization Files

FY	# of people	# of records	Mean # of visits	Min. # of visits	Max. # of visits	First VA Visit	VA visit before DOD discharge	Total # of records in AAC
1986	7,766	26,975	3.5	1	108	7,766	1,106	10,291,501
1987	15,974	77,725	4.9	1	225	11,327	1,621	20,074,180
1988	20,691	111,170	5.4	1	232	11,062	1,657	21,775,130
1989	23,739	131,447	5.5	1	344	9,945	1,294	21,230,674
1990	27,461	160,284	5.8	1	353	10,410	1,233	21,653,076
1991	30,625	190,178	6.2	1	354	10,171	969	22,286,848
1992	36,964	229,267	6.2	1	356	12,853	1,036	23,081,737
1993	41,374	263,439	6.4	1	354	12,664	1,039	23,329,385
1994	43,631	306,322	7.0	1	356	10,403	943	24,419,396
1995	46,260	351,474	7.6	1	353	9,637	755	26,501,144
1996	49,231	402,624	8.2	1	348	9,404	988	28,371,349
1997	53,853	475,574	8.8	1	276	10,031	949	47,495,447
1998	58,068	540,163	9.3	1	305	8,797	1,104	57,635,636
1999	61,043	584,738	9.6	1	336	8,614	709	61,666,068
2000	60,094	590,168	9.8	1	351	4,574	0	63,665,970
2001	57,055	512,865	9.0	1	304	2,420	0	54,262,301
(partial)								
Total	150,075	4,954,413	33.0	1	3,267	150,075	15,403	

Total # of DOD Cases = 280,444

People who had VA visits before DoD discharge
 n = 15,403
 Days before DoD discharge:
 Mean =781 days, median=393 days, Mode=1 day
 Min=1 day, Max=4,960 days

 People who are in VA and DoD databases n=150,078
 Age at the first VA encounter: Mean=30 yrs, Median=27 yrs, Mode=25 yrs Min=19 Max=54

VA Utilization Files at National Computer Center

Description	Location	# of Variables	Comment
Outpatient Files:			
SF Files: Visit File			
FY91- Present	MDPPRD.MDP.SAS.Sfyy	49	100% data
FY86 – FY90	MDPPRD.MDP.SAS.SIYY MDPPRD.MDP.SAS.OPC.FYyy.F	49	100% data
FY80 – FY85	MDPPRD.MDP.STAFF.Syy		20% sample
SC Files: Procedure File	MDFFRD.MDF.STAFT.Syy		2070 Sample
FY90 – Present	MDPPRD.MDP.SAS.SCyy	45	100% data
SG Files: Diagnosis File	MDFFRD.MDF.SAS.SCyy	43	10070 data
FY97 – Present	MDPPRD.MDP.SAS.SGyy	21	100% data
SE Files: Event File	WDITRD.WDI.SAS.SGyy	21	10070 data
FY99 – Present	MDPPRD.MDP.SAS.SEyy	79	100% data
1 1 / / Tresent	Wibi i Rb.Wbi .SAS.SEyy	'	10070 data
Inpatient Files:			
Impatient Thesi			
PM Files: Main File			
FY91 – Present	MDPPRD.MDP.SAS.PMyy	73 - 79	100% data
FY84 - FY90	MDPPRD.MDP.SAS.VAH.PMyy	72	100% data
FY82 - FY83	MDPPRD.MDP.PTF.PyyG	77	100% data
FY70 - FY81	MDPPRD.MDP.PTF.Pyy	64 -71	100% data
PP Files: Procedure File	, , , , , , , , , , , , , , , , , , , ,		
FY91 – Present	MDPPRD.MDP.SAS.PPyy	27	100% data
FY88 - FY90	MDPPRD.MDP.SAS.VAH.PPyy		
PB Files: Bedsection File			
FY91 – Present	MDPPRD.MDP.SAS.PByy		100% data
FY84 - FY90	MDPPRD.MDP.SAS.VAH.PByy		
PS Files: Surgery File			
FY91 – Present	MDPPRD.MDP.SAS.PSyy	30	100% data
FY84 - FY90	MDPPRD.MDP.SAS.VAH.Psyy		
SSN Files			
OPC: FY86 – FY00	MDPPRD.PRO.SAS.Fyy.OPCSSNF		
	,		
Compensation and			
Pension File			
			1000/ 1
Current	MDPPRD.PRO.SAS.DMS.CPMINI	68	100% data
DIDI C Mandalida E'I			
BIRLS Mortality File			
Current	MODDED DEC CACALLA DIDI C	22	1009/ data
Current	MDPPRD.PRO.SAS.VHA.BIRLS.	32	100% data
	DEATHS		

Note: yy=year of data

TAIHOD Data Used for this Study

File Type	Years	Source	Contents
Demographics	1971-1999	Defense Manpower Data Center	Contains all demographic and occupational data including gender, race, ethnicity, marital status, time in service, ASVAB scores, primary and secondary MOSs.
Inpatient Hospitalization	1980-1999	Patient Administration Systems and Biostatistics Activities	Contains information regarding an inpatient visit, including up to eight diagnostic and four procedural codes per visit, dates of diagnosis and disposition, bed days, etc.
Disability	1980-1999	Army Disability Agency	Contains information regarding any appearance before a preliminary or final disability board, including VASRD code and final disposition.
Discharge	1971-2000	Defense Manpower Data Center	Contains information regarding the date and reason for discharge, and all demographics at the time of discharge.
Death	1980-1999	Directorate for Information Operations and Reports (DIOR)	Contains information regarding the circumstances of the casualty, including manner (accident, illness, etc), place, and date.